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Comment on the Minnesota Transracial Adoption Study

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Data from the Minnesota transracial adoption study reported in Weinberg, Scarr, and Waldman (1992) is reanalyzed and shown to be consistent with the hypothesis that the mean black/white difference in IQ is significantly genetic in origin.

Weinberg, Scarr, and Waldman (1992) presents follow-up data on their study of black, mixed-race, and white children adopted by white families. In retrospect, they summarize their conclusions from their initial assessment of the performance of the adoptees as indicating that "putative genetic racial differences do not account for a major portion of the IQ performance difference between racial groups" (p. 118) and they seem inclined to interpret their follow-up as consistent with that conclusion. Weinberg, in a relatively recent article, although one published before the appearance of the follow-up, takes the study to have "disputed the hypothesis that IQ differences between blacks and white are due to genetic differences" (Weinberg, 1989, p. 101), although he does allow that h^2, the proportion of variance between individuals in IQ explained by genetic variation, is .5. (To be completely explicit, we may use H^2 to denote the proportion of the variance between races in IQ that is explained by between-race genetic variation.)

There is an ambiguity in this remark cited from Weinberg: It is not clear whether he means to deny that *all* between-race variance is explained by genetic differences between the races, which is a position no one holds, or to deny that *any* of the between-race variance is explained by such genetic differences. If Weinberg is disputing the latter claim, he is implicitly making the very adventurous assertion that all mean race differences are due to differences in the environments in which members of different races find themselves. What to call these various positions is more significant than most definitional questions because of the emotions surrounding the issue of the size of H^2. It may be considered unfair to define *environmentalism* as the hypothesis that $H^2 = 0$ and

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hereditarianism as the denial of environmentalism so understood, because this usage turns environmentalism into an extreme position. At the same time, a hypothesis amounting to $H^2 = 0$ continues to be adopted and called *environmentalism* in the popular and semitechnical polemical literature (see, for example, Hacker, 1992, pp. 26–27; Lewontin, Rose, & Kamin, 1984, p. 88). It might aid clarity in the long run to order various versions of environmentalism and hereditarianism by strength, for instance, by defining *weak environmentalism* as the hypothesis $H^2 < 1$, *moderate environmentalism* as the hypothesis $H^2 \leq .2$, and *strong environmentalism* as the hypothesis $H^2 = 0$. However, in deference to what may be unfortunate current usage, the present author will continue to use the term *environmentalism* for the position that all mean phenotypic race differences are caused by environmental factors, and the term *hereditarianism* for the denial of this position.

REANALYSIS

Table 1 summarizes the mean performance of family members and adoptees on various measures of mental ability and achievement in both 1975, when the average age of the adoptees was 7 and that of the birth children 10, and 1986. I have omitted reference to the Asian/Indian cohort. In general, black/black (B/B) + black/white (B/W) is slightly smaller than what the authors call the "black/interracial" cohort, because the parentage of some "socially classified black children" was not known (Scarr & Weinberg, 1981, p. 122). I have disaggregated whenever possible and used figures for the "black/interracial" cohort only when separate figures for B/B and B/W are not given.

The authors attribute the uniform decline in IQ scores from 1975 to 1986 largely to "test revision and test norm obsolescence," citing studies documenting an average decline of 7 points in scores from the Wechsler Adult Intelligence Scale (WAIS) to the WAIS-Revised. Because there is considerable lack of clarity as to whether the overall population rise in IQ relative to the older norms is real or artifactual, and if real what its cause might be, the present comment takes no position on the issue. The comparisons derived from the target article control for test revision in any case.

As the authors assert, these data do "demonstrate persistent beneficial effects of being reared in the culture of the schools and the IQ tests" (Weinberg, Scarr, & Waldman, 1992, p. 131), for in both 1975 and 1986 the IQs of the B/B children exceeded the national black average. The mean IQ of the 7-year-old B/B group in 1975 was 96.8, .78 *SD* (standard deviation) above the national black mean, although still a significant .22 *SD* below the national white mean. It should also be noted in this connection, however, that the mean IQ of blacks in Minnesota appears to be considerably above the national level (Shuey, 1966, pp. 155, 183). (No national data for B/W children are cited, and I know of none.) The authors also take the data to show that "the social environment maintains a dominant role in determining the average level of black and interracial children"; as noted, they

TABLE 1
Performances of Cohorts on Measures of Ability and Attainment

Measure	Parental	Biological Offspring	B/W	B/B	W
N[a]	171	118	(105)[b]	(105)[b]	18
IQ 1975	119.5 *N* = 198	116.7 *N* = 143	109 *N* = 68	96.8 *N* = 29	111.5 *N* = 25
IQ 1975[a,c]	120.3 *N* = 158	116.4 *N* = 104	109.5 *N* = 55	95.4 *N* = 21	117.6 *N* = 16
IQ 1986[d]	115.35	109.4	98.5	89.4	105.6
Vocabulary 1975[e]	—	73	(57)[b]	(57)[b]	NG[f]
Vocabulary 1986[e]	—	70	60	54	62
Reading 1975[e]	—	74	(55)[b]	(55)[b]	NG
Reading 1986[e]	—	73	59	48	56
Math 1975[e]	—	71	(55)[b]	(55)[b]	NG
Math 1986[e]	—	69	50	36	56
Aptitude 1986[e]	—	66	42	17	61
Class Rank 1986[e]	—	64	40	36	54
G.P.A. 1986	—	3.0	2.2	2.1	2.8

Note. From "The Minnesota Transracial Adoption Study: A Follow-Up of IQ Test Performance at Adolescence" by R. Weinberg, S. Scarr, and I. Waldman, 1992, *Intelligence, 16*, p. 129. Copyright 1992 by Ablex Publishing Corporation. Adapted by permission.

[a]Of participants in follow-up study. [b]B/B and B/W not disaggregated. [c]Stanford-Binet, WISC, or WAIS. [d]WISC-R or WAIS-R. [e]In percentile rank. [f]Not given.

had previously concluded that "putative racial genetic differences do not account for a major portion of the IQ performance difference between racial groups," and here they reiterate that "genetic background" is not the sole determinant of the race difference in IQ. However, they stop short of endorsing environmentalism, and in fact, contrary to their suggestions, the data support a fairly strong form of hereditarianism.

The comparisons most relevant to hereditarianism are clearly those between the B/B cohort and the birth children, and between the B/B adoptees and the W cohort, where group comparisons are expressed in *d* units, a weighted pooling of the *SD*s of all four cohorts.[1] The authors compute a pairwise *d* of .99 for the birth

[1]That is, the unit of *d* for two of *n* populations with respect to a variable is taken here to be the average of the *SD*s for each of the *n* populations weighted by population size. Other possible units are the square roots of the means of the weighted or unweighted variances. The computing formula used in the target article is a function of the (pairwise) mean of *SD*s.

children and the combined black/interracial group. However, using their data, we also see that *d* for the birth cohort–B/B cohort in 1975 was 1.63 and in 1986, 1.58. (These numbers are inflated by the rather small sample *SD*s; assuming a "true" pooled *SD* of 15 reduces both *d*s to about 1.3.) Prima facie, these rather large *d*s are not predicted by environmentalism. If environmental differences account for all the between-race difference in IQ test performance, one would expect the difference in IQ between the B/B cohort and the birth children to be no larger than the deviation of the birth children from the white genetic mean (see later). Environmentalists would presumably expect preadoption experience to be a significant source of variance, but Weinberg et al. (1992) report that, so far as could be determined given its limited range of variation, time of adoption explained only 7% to 17% of the variance in adoptee test scores.

There is evidence that the birth cohort was in fact not genetically typical of the white population. "Clergyman, engineer and teacher" are given as the typical occupations of the adoptive fathers, who average 16.9 years of schooling (Scarr & Weinberg, 1981, p. 116). The adoptive families are characterized overall as "highly educated and above average in occupational status and income." It is reasonable to assume that the birth cohort is considerably above the white mean genetically, which means that a large *d* separating this birth cohort from the B/B group does not refute the null hypothesis that $H^2 = 0$. (It should be noted that this objection is unavailable on the hypothesis that $h^2 \approx 0$.) However, a natural control is the cohort of white adoptees, who may be presumed not to be above the white average in genetic makeup. In 1975, *d* for the W and B/B cohorts was 1.72, and in 1986 it was 1.28. Assuming an *SD* of 15 for both populations in both years reduces the *d*s to 1.48 and 1.08, respectively. Thus, genetically typical whites and presumably genetically typical blacks raised from birth in the same (unusually favorable) environments differ at the end of adolescence by at least 1 *SD*, the usual black/white gap on measures of mental ability reported in the testing literature. There is no obvious reconciliation of environmentalism with this effect size for the W–B/B cohorts.

A sharper focus is provided by the common environment of the adoptees. Environments within families whose parental IQ is 115 and whose children's IQs are 109 (using the more recent norms) are presumably quite rich, whether because rich environments produce high IQs or high IQs produce rich environments. That the adoptive environments were indeed favorable to cognitive development is further indicated by the above-average performance on all measures by the W adoptees, a sample, as noted, that is presumably not biased toward the high end of the white population. The data thus indicate that being reared in an unusually rich environment up to age 7 brings the IQs of typical black children to within −.2 *SD* of the white mean and that being reared in such an environment up to age 17 brings black IQs to within −.8 *SD* of the white mean.

The 1986 B/B mean was 89.4 on tests on which the national black mean is 85 (Jensen & Reynolds, 1982). Assuming the black adoptees represent the overall

black population, blacks raised to adolescence in a white environment thus do about .3 *SD* better than they would in a black environment, less improvement than is expected if blacks and whites do not differ in the polygene expressed as intelligence. The hypothesis that best fits the data, rather, is that genetic variation between the races explains about 70% of the intelligence difference: H^2 is $.7^2 = .5$. This estimate is precisely Plomin's estimate for h^2 (Plomin, 1990). It may however understate the H^2 to be estimated from Weinberg et al. (1992) because of the superior richness of the adoptive environments. Attempting to measure the extent of this superiority may appear to be an exercise in arbitrariness, but three possible assumptions about within-family environment suggest themselves as suitable in the present case.

1. A family's environment is reflected by the IQ of its birth children, in this case 109 in 1986. By this measure, the B/B adolescents were raised in environments whose mean was $(109 - 100)/15 = .6$ *SD* richer than the white mean, and, on the same assumption, 1.6 *SD* richer than the black mean. It follows that a 1 *SD* improvement in environment makes a $.3/1.6 = .1875$ *SD* difference in IQ for the B/B adoptees, yielding a value for H^2 of $(1 - .1875)^2 = .66$.
2. Richness of family environment is reflected by parental IQ, in the present case about +1 *SD*. Estimated H^2 is then $(1 - .15)^2 = .7$.
3. It might be most natural to measure family environment by the IQ of white adoptees reared within it, although this procedure ignores genotype/environment correlational effects. In that case, computations like the foregoing yield an estimate for H^2 of .59.

The first two estimates especially are very close to those for h^2 derived from twin studies (Bouchard, Lykken, McGue, Segal, & Tellegen, 1990).

The trends found for IQ are maintained on the other measures of academic achievement, particularly mathematics, general aptitude and, overall class rank. Thus, the overall academic performance of the B/B adoptees by late adolescence, as indicated by a mean class rank in the 36th percentile, is significantly below the definitional mean class rank of 50. I have been unable to find data on the mean class rank for blacks nationally in elementary and secondary schools, but if class rank parallels IQ, that figure would be the 16th percentile. (Expressing the white mean IQ as $z = 0$, the black mean lies at $z = -1$, above 16% of the white population.) This assumption is consistent with the 3:1 overrepresentation of blacks in special education courses, the two to three grade race difference on typical tests of achievement, and other indicators of attainment. A mean class rank at the 36th percentile corresponds (by a numerical coincidence) to a z of $-.36$. It follows that blacks reared in an environment 1.6 *SD* above the black environmental mean show a .64 *SD* improvement in class rank. It would follow in turn that race explains 36% of the between-race variance in class rank.

Again using data from the target article, Table 2 displays the differences

TABLE 2
Between-Cohort Differences in Performance

Measure	*d*(birth–B/B)	*d*(birth–B/W)	*d*(birth–W)	*d*(W–B/B)	*d*(W–B/W)
IQ 1975	1.63	.53	−.09	1.72	.63
IQ 1986	1.58	.86	.3	1.28	.56
Vocabulary 1975	.94[a]	.94[a]	—[b]	—[b]	—[b]
Vocabulary 1986	.62	.39	.31	.31	.08
Reading 1975	.71[a]	.71[a]	—[b]	—[b]	—[b]
Reading 1986	.93	.52	.56	.37	−.03
Math 1975	.65[a]	.65[a]	—[b]	—[b]	—[b]
Math 1986	1.3	.76	.52	.8	.24
Aptitude 1986	2.0	.98	.2	1.8	.78
Class rank 1986	.96	.82	.34	.62	.48
G.P.A. 1986	1.28	1.14	.28	1.0	.85
$\bar{d}$	1.14	.75	.26	.99	.45

[a]Black and mixed-race not disaggregated. [b]Data not available.

between the birth cohort and the three adoptive cohorts on the various indicators of mental ability and achievement. The bottom row indicates the average of the *d*s in each column. Table 2 supports certain generalizations. The *W* group does consistently better than the B/W group (except in reading in 1986), and the B/W group does consistently better than the B/B group. In light of the means of the *d*s, B/W performance may thus be described as falling a bit above halfway between the B/B and the birth children, and W performance as falling about three quarters of the way toward the birth children. With normalizing so that the W performance is 1 and the B/B performance 0, the B/W cohort lies at .545, a bit more than halfway between the W and B/B cohorts.

Although genotype/environment interaction precludes a precise numerical prediction, this is the ordering and the rough magnitude of the gaps predicted by hereditarianism. If genetic differences explain a significant portion of phenotypic race differences, and particularly if the mean white genotype produces higher intelligence than the mean black genotype when environment is held constant, the intelligence of black/white hybrids should be intermediate (and that of genetically typical whites should lie between that of the hybrids and the genetically favored whites). If, on the other hand, blacks do less well than whites because of ill-treatment based on race, it is not clear why light-colored but still obviously negroid blacks should outperform darker blacks. The *SD* for the distribution of the birth–B/W *d*s is a fairly small .21, indicating that the gap between the performance of the birth and the B/W cohort is roughly constant across variables. One might speculate that whites dislike lighter colored blacks less than darker colored blacks, but it is hard to believe that the effects of animosity should so closely mimic the predictions of hereditarianism. Environmentalism must

postulate a fine calibration of the response of the hybrids to trait-relevant societal animosity.

The transracial adoption design is of intense interest because it controls for a number of environmental variables commonly cited to explain race differences in phenotypic intelligence. It is possible that among the environmental variables the transracial adoption design does not control for are some which explain the race difference. However, these variables must be specified and shown independently to affect IQ test performance before this possibility can be cited as an alternative explanation of the data.

CONCLUSIONS

Comparative confirmation of hypotheses in science comes down to which of two competing hypotheses makes the available data more natural and predictable. The data presented in the target study are just what they would be if H^2 were rather large, but they are very surprising if H^2 were near 0. So the study makes hereditarianism more probable than it was before and environmentalism less probable.

There is a final observation to be made with much greater tentativeness, because the subject is not discussed explicitly in the target article, although it is raised in Scarr and Weinberg (1981). Granted that being raised in "the culture of the schools and the IQ tests" has a positive if modest effect on the IQ of black children, it might seem advisable to replicate this culture in black homes. It is possible, however, that this cultural environment is "artificial" relative to black homes, in the sense that it would have to be created and maintained by outside intervention. This cultural environment itself might be a correlate of white genotypes; the "culture of the schools and the IQ tests" may itself be a genetic effect, not replicable with just any array of genotypes. (Plomin & Niederhiser, 1992, cite evidence of "significant genetic effects" for measures of family environment.) If so, the increase of .3 *SD* in mean black IQ found in the target study would not be self-perpetuating.

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